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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/056,242      | 01/23/2002  | Bo Chang             | CYPR-PM01007        | 7803             |

7590

05/16/2003

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EXAMINER

LAIR, DONALD M

ART UNIT

PAPER NUMBER

2858

DATE MAILED: 05/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/056,242

Applicant(s)

CHANG ET AL.

Examiner

Donald M. Lair

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 9-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1 – 8, drawn to a method for testing wire bonds, classified in class 438, subclass 17.

II. Claims 9 – 13, drawn to an integrated circuit packaging device with substrate, classified in class 438, subclass 106.

III. Claims 14 – 19, drawn to an array molded laminate substrate, classified in class 438, subclass 125.

IV. Claims 20 – 24, drawn to an array substrate, classified in class 438, subclass 107.

2. Inventions of Group I and II, I and III, and I and IV are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the method of testing for wire bonding could be used in any package wherein wire bonds are present, and the ways in which the wire bonds are formed between substrates is independent of the steps of the test. More specifically, this method of testing could be used on any one of a plurality of different IC packages, such as flip-chip or ball grid array type packages. Further, Group IV could be any type of substrate wherein wire bonds are capable of being attached thereon.

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3. Inventions of Group II - Group III and Group II - Group IV are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because Group II is directed to the finished integrated circuit, wherein it includes the external laminate substrate of Group III as well as the internal array substrates of Group IV. Group II is not specific to the type of package used, and could be, for example, a flip-chip or ball grid array type package. Further, Group IV could be any type of substrate wherein wire bonds are capable of being attached thereon.

4. Inventions of Group III and Group IV are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention of Group III has separate utility such as it is a laminate substrate with two surfaces, wherein the invention of Group IV is bonded to the internal surface. See MPEP § 806.05(d). Group IV could be bonded to the internal surface of a plurality of different types of packages, such as a flip-chip or ball grid array type package.

5. During a telephone conversation with Anthony Murabito on 04/29/03 a provisional election was made and not traversed to prosecute the invention of a method for testing wire bonds in an integrated circuit package, Claims 1 – 8. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9 – 24 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

*Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 and 4 – 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Abel et al. (US-4,812,742).

8. In regards to Claim 1, Abel et al. disclose a method for testing wire bonds in an integrated circuit package comprising bonding an integrated circuit silicon die to a package substrate, forming a wire connection between a circuit contact pad in the integrated circuit silicon die and a lead contact pad in the package substrate, and testing the wire connection for detection of “non-stick failure” with a testing device, wherein the silicon substrate of the integrated circuit provides electrical continuity for the non-stick detection between the circuit contact pad and a dedicated contact pad in the package substrate which is electrically coupled to the testing device (Column 2, lines 5 – 29).

9. In regards to Claim 4, Abel et al. disclose a method comprising all the elements described above, wherein each of the lead contact pads in the package substrate are electrically isolated from other lead contact pads in the package substrate (Column 2, lines 8 – 10).

10. In regards to Claim 5, Abel et al. disclose a method comprising all the elements described above, wherein bonding the integrated circuit silicon die provides electrical continuity between the integrated circuit silicon die and the dedicated pads in the package substrate (Column 2, lines 15 – 25).

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11. In regards to Claims 6 and 7, Abel et al. disclose a method comprising all the elements described above, wherein testing the wire connections for non-stick failure comprises testing the wire connection for continuity and shorts through a circuit contact pad on the integrated circuit die and a dedicated contact pad in the package substrate (Column 2, lines 15 – 25).

12. In regards to Claim 8, Abel et al. disclose a method comprising all the elements described above, wherein the method is clearly designed to be performed recursively on a plurality of wire connections (Column 2, lines 5 – 25).

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abel et al. in view of Brooks et al. (US-6,326,244).

15. In regards to Claims 2 and 3, Abel et al. disclose the method of testing described above, but fail to teach how the integrated circuit die is bonded to the package substrate.

16. Brooks et al. teach using electrically non-conductive, thermally conductive epoxy to bond the integrated circuit die to the package substrate (Column 7, lines 21 – 35).

17. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method disclosed by Abel et al. by using an electrically non-conductive, thermally conductive epoxy to bond the integrated circuit die to the package substrate, as taught by Brooks et al., for the purpose of protecting the package components.

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*Pertinent Prior Art*

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

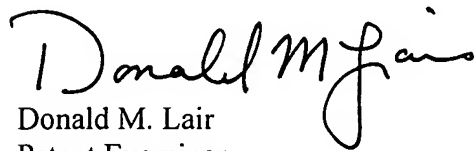
19. Nishida (US-5,777,381), teaches using an electrically conductive epoxy resin to bond the integrated circuit die to the package substrate (Column 6, lines 44 - 48).

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald M. Lair whose telephone number is (703) 305-4450. The examiner can normally be reached on Monday - Friday, 8 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (703) 308-0750. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1436.



Donald M. Lair  
Patent Examiner  
Art Unit 2858  
May 13, 2003



N. Le  
Supervisory Patent Examiner  
Technology Center 2800